Table 1. Eligibility criteria for including studies in this systematic review.

Inclusion Criteria:

1. Study Design: randomised controlled trials and quasi-randomised controlled trials.
2. Types of Participants: reproductive-aged women with a diagnosis of polycystic ovary syndrome (PCOS) based on the National Institute of Health (NIH) diagnostic criteria (1990), the Rotterdam ESHRE/ASRM (2003) diagnostic criteria or the AE-PCOS Criteria (2006). We also included trials where the PCOS diagnosis had been verified by a general practitioner or specialist clinician.
3. Comparators: exercise vs usual care/control, exercise combined with diet vs usual care/control, exercise combined with diet vs diet only. Exercise combined with diet vs exercise only, exercise vs diet, exercise combined with pharmaceutical vs pharmaceutical.
4. All outcomes; Expected outcomes included: primary outcomes, such as blood pressure, fasting blood glucose, insulin and lipid concentrations; and secondary outcomes, such as body mass index, cardiorespiratory fitness, testosterone, free androgen index and health related quality of life measures.

Exclusion Criteria:

1. Study Design: case studies, cross sectional and non-randomised controlled trials.
2. Types of Participants: males, adolescent females, post-menopausal women, women without PCOS
3. Comparators: women with PCOS vs healthy controls, pharmaceutical vs exercise, pharmaceutical vs diet, diet vs diet, surgical vs any other condition.

Table 2. Characteristics of studies included in this systematic review.

Study (design)	*N* randomised/ analysed	Intervention Duration (assessment points)	Participant Characteristics (PCOS diagnostic criteria)	Intervention	Outcome measures
Almenning et al. [32] (RCT)	HIIT: 10/8 RT: 11/8 CON: 10/9	10 wks (baseline, 10 wks)	age: 27.2±5.5 y BMI: 26.7±6.0 kg/m^2 (Rotterdam)	HIIT frequency: 3 times/wk HIIT intensity: 2 d/wk, 4 x 4 mins 90-95% HR_{max} / 3 x 3 mins ~70% HR_{max}. 1 d/wk, 10 x 1 min 'all-out' / 10 x 1 min rest. RT frequency: 3 times/wk RT sets x reps: 3 x 10 RT load: 75% 1-RM	HOMA-IR, FBG, FI, TG, TC, LDL-C, HDL-C VO_2 max, RHR, BW, BMI, WC, BF%, FM, FFM, T, SHBG, FAI, hsCRP.
Brown et al. [96] (RCT)	EX: 21/8 CON: 16/12	20-24 wks due to varying length of ramp up phase (baseline, immediately post)	age: 32.3 ± ns y BMI: 33.0 kg/m^2 (NIH)	Exercise: 12 wk moderate-intensity intervention preceded by 8-12 wk ramp-up. Aerobic duration: ~228 mins/wk (≤ 60 bouts) Aerobic intensity: 40-60% VO_2 max	FBG, FI, HOMA-IR, TG, LDL-C, HDL-C, VO_2 max, BW, BMI, WC, FT, SBP, DBP.
Bruner et al. [97] (RCT)	EX + DIET: 7/7 DIET: 5/5	12 wks (baseline, 12 weeks)	age: 30.7±4.6 y BMI: 36.6±6.0 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Aerobic intensity: 70-85% HR_{max} Aerobic duration: 30 mins (+10-min warm-up) RT sets x reps: 2-3 x 10-15 RT load: not specified Diet: 1 hour/wk of nutritional counselling	FI, QUICKI, VO_2 max, BW, BMI, WC, T, SHBG, FAI
Guzick et al. [98] (RCT)	EX + DIET: 6/6 CON: 6/6	12 wks (baseline, 12 weeks)	age: 31.7±10.0 y BMI: ns (NIH)	Exercise frequency: 5 times/wk Exercise intensity: 1050-4200 kJ/wk Diet: VLCD (8 wks) with calories increased over final 4 wks (4200-5040 kJ/d). 'Optifast' used to supplement diet.	FBG, FI, BW, WHR, T, SHBG, FT, LH, FSH.

Study (design)	*N* randomised/ analysed	Intervention Duration (assessment points)	Participant Characteristics (PCOS diagnostic criteria)	Intervention	Outcome measures
Hoeger et al. [99] (RCT)	LS + PLA: 11/6 PLA: 9/7 LS + MF : 9/5 MF: 9/5	48 wks (baseline, 24 wks, 48 wks)	age: 28.5±5.2 y BMI: 39.0±6.1 kg/m^2 (NIH)	Exercise programme: Individualised to achieve 150 minutes per wk Diet: Individualised healthy balanced meal plan to achieve 500-1000 kcal deficit per day Metformin: 850 mg 2 times/day	BW, T, SHBG, FAI
Konopka et al. [101] (RCT)	EX: 12/12 CON: 13/13	12 wks (baseline, 12 wks)	age: 35±5.0 y BMI: 33.0±5.0 kg/m^2 (Rotterdam)	Exercise frequency: 5 times/wk Exercise intensity: 65% VO_2 peak Exercise duration: 60 mins	FBG, FI, HOMA-IR, BMI, BW, FM, FFM, E_2
Nasrekani et al. [103] (RCT)	EX: 10/10 CON: 10/10	12 wks (baseline, 12 wks)	age: 30.4±5.9 y BMI: 28.3±6.2 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise intensity: 40-65% HR_{max} Exercise duration: 25-30 mins	VO_2 max, BW, BMI, FSH, LH.
Nybacka et al. [104-105] (RCT)	EX: 19/17 EX + DIET: 19/12 DIET: 19/14	4 months (baseline, 4 months)	age: 30.8±5.2 y BMI: 36.0 ± 6.2 kg/m^2 (Rotterdam)	Exercise programme: Individualised to meet individuals' capacity, goals and interest. Diet: ≥ 600 kcal/day reduction maintaining 55-60% CHO, 25-30% fat and 10-15% protein.	FBG, FI, HOMA-IR, BW, BMI, WHR, BF%, FFM, T, SHBG, FT, E_2, FSH, LH
Petranyi *et al.* [106] (QRCT)	LS+MF: 29/29 MF: 27/27	6 months (baseline, 6 months)	Age: 29 ± ns y BMI: 27.2±6.9 kg/m^2 (Rotterdam)	Exercise programme: recommendation to increase physical activity levels. Specifics unclear. Diet: low glycaemic index diet with caloric restriction for those who are obese. Metformin: 500 mg 3 times/day	BMI, WHR

Study (design)	*N* randomised/ analysed	Intervention Duration (assessment points)	Participant Characteristics (PCOS diagnostic criteria)	Intervention	Outcome measures
Roessler et al. [34] (Randomised crossover)	EX: 8/7 CON: 9/7	16 wks (baseline, 8 wks, 16 wks)	age: 31.7±7.9 y BMI: 36.3±7.2 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk (2 x cycle, 1 x walk) Exercise intensity: following 2-week ramp, cycling 20-180 secs 80-100% HR_{max} / rest 25-180 secs 45-65% HR_{max}. Walking 3-5 mins 80-90% HR_{max} / 1 min 50-60% HR_{max}. Exercise duration: 45 mins (+10 min warm-up). Control: Group counselling sessions (2 hours, 1 time/wk) focussing on barriers and motivation.	VO_2 max, BW, BMI, WC
Sa et al. [107-108] (RCT)	EX: 15/14 CON: 15/13	16 wks (baseline, 16 wks)	age: 26.0±5.0 y BMI: 32.8±4.6 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise intensity: 60-85% HR_{max} Exercise duration: 40 mins (+5 mins)	SBP, DBP, FI, BMI, RHR, VO_2 max, T, FSH, LH
Saremi et al. [109] (RCT)	EX: 11/11 CON: 11/11	8 wks (baseline, 8wks)	age: 35.2±4.4 y BMI: 28.3±4.3 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise intensity: 40-65% HR_{max} Exercise duration: 30 mins	FBG, FI, HOMA-IR, TG, TC, LDL-C, HDL-C, VO_2 peak, BW, BMI, BF%, WC, WHR
Saremi et al. [110] (RCT)	EX + PLA: 10/10 CON : 10/10 EX + CAL: 10/10	8 wks (baseline, 8 wks)	age: 27.1±5.1 y BMI: 25.5±2.7 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk RT sets x reps: 1-2 x 15-20 RT load: 40-60% 1-RM	FBG, FI, HOMA-IR, TG, TC, LDL-C, HDL-C, BW, BMI
Stener-Victorin et al. [100, 102, 111-113] (RCT)	EX: 34/22 CON: 17/13 ACU: 33/24	16 wks (baseline, 16 wks, 32 wks)	age: 30±4.4 y BMI: 28.1±7.3 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise intensity: HR ≥ 120 BPM Exercise duration: 30-45 mins Low-frequency electroacupuncture: 14 x 30 min treatments over 16 wks.	SBP, DBP, FBG, FI, HOMA-IR, TG, TC, LDL-C, HDL-C, BMI, WHR, T, FT, SHBG, FAI, LH, FSH, VO_2 max, BMI, E_2

Study (design)	*N* randomised/ analysed	Intervention Duration (assessment points)	Participant Characteristics (PCOS diagnostic criteria)	Intervention	Outcome measures
Thomson et al. [33, 114-116] (RCT)	AET + DIET: 31/18 AET + RT + DIET: 33/20 DIET: 30/14	20 weeks (baseline, 10 wks, 20 wks)	age: 29.3±6.8 y BMI: 36.1±4.8 kg/m^2 (Rotterdam)	Exercise frequency: 5 times/wk (3 x aerobic, 2 x RT in combined exercise group) Aerobic intensity: 60-65% HR_{max} progressed to 75-80% HR_{max} by study end Aerobic duration: 25-30 mins progressed to 45 mins by study end RT sets x reps: 3 x 12 RT load: 50-60% 1-RM progressed to 65-75% 1-RM after 2 weeks Diet: energy restricted high protein diet (5000-6000 kJ/day).	SBP, DBP, FBG, FI, HOMA-IR, TG, TC, LDL-C, HDL-C, BW, BF%, FM, FFM, WC, T, SHBG, FAI, PCOS-Q
Turan et al. [117] (RCT)	EX: 16/14 CON: 16/16	8 wks (baseline, 8 wks)	age: 24.5 ± 2.8 y BMI: 21.9±3.5 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise duration: 50-60 mins Aerobic intensity: 65-70% HR_{max} RT sets x reps: 1 x 15 RT load: 5-6 on RPE for RT scale	SBP, DBP, FBG, HOMA-IR, FI, TG, TC, HDL-C, LDL-C, BMI, WC, RHR, VO_2 max, T, FT, E_2, LH, FSH
Vigorito et al. [118] (RCT)	EX: 45/45 CON: 45/45	3 months (baseline, 3 months)	age: 21.8±2.1 y BMI: 29.4±3.2 kg/m^2 (Rotterdam)	Exercise frequency: 3 times/wk Exercise intensity: 60-70% VO_2 max Exercise duration: 30 mins	SBP, DBP, FBG, FI, TG, TC, LDL-C, HDL-C, VO_2 max, RHR, BMI, WC, E_2, T, FT, SHBG, FAI, LH, FSH, CRP
Vizza et al. [119] (RCT)	EX: 8/7 CON: 7/6	12 wks (baseline, 12 wks)	age: 27±5.0 y BMI: 37.8±11.4 kg/m^2	Exercise frequency: 4 times/wk (2 x RT, 2 home-based) RT sets x reps: 2-3 x 8-12 RT load: Progressed with strength gains Home-based: Callisthenics, 3 sets of 10 reps	FBG, FI, HOMA-IR, BW, BMI, WC, FM, FFM, BF%, hsCRP, T, SHBG, FAI, PCOS-Q, SF-36

Studies presented by lead author and year of publication. Design; RCT: randomised controlled trial, QRCT: quasi-randomised controlled trial. *N* randomised: the number of participants randomised into each study arm at the study initiation; analysed is the number of participants included within the analysis; HIIT: high-intensity interval training; RT: resistance training; CON: control group; EX: exercise group; DIET: dietary intervention; LS: lifestyle; PLA: placebo; MF: Metformin; ACU: acupuncture; AET: aerobic

exercise training; CAL: calcium supplementation. Intervention duration: length of the duration; assessment points: the time-points at which researchers have assessed outcome measures. Participant characteristics presented as mean ± standard deviation (SD) or median in one study [96] for age (in years; y) and BMI (kg/m^2) at study entry; ns: not specified. Diagnostic criteria: the specific criteria used to confirm a PCOS diagnosis; NIH: National Institute of Health (1990) diagnostic criteria; Rotterdam: European Society for Human Reproductive and Embryology/American Society for Reproductive Medicine (2003). Outcome measures refers to the outcomes from each study that are relevant to this systematic review. VO_2 max: maximum oxygen uptake; RHR: resting heart rate; HDL-C: high density lipoprotein cholesterol; LDL-C: low density lipoprotein cholesterol; TC: total cholesterol; TG: triglycerides; FBG: fasting blood glucose; FI: fasting insulin; HOMA-IR: homeostatic assessment of insulin resistance; QUICKI: quantitative insulin sensitivity check index; FM: fat mass; FFM: fat free mass; BF%: body fat percentage; BW: body weight; BMI: body mass index; WC: waist circumference; WHR: waist to hip ratio; SHBG: sex hormone binding globulin; FAI: free androgen index; T: testosterone; FT: free testosterone; E_2: oestradiol; LH: luteinising hormone; FSH: follicle stimulating hormone; SBP: systolic blood pressure; DBP: diastolic blood pressure; hsCRP: high-sensitivity C-reactive protein; d: day; mins: minutes; wk: week; reps: repetitions; RM: maximum number of repetitions; HRmax: maximum heart rate; PCOSQ: PCOS health-related questionnaire; SF-36: Optum36-item Short Form Survey; VLCD: very low calorie diet; CHO: carbohydrate.

Table 3. Effect estimates and heterogeneity for change from baseline to post-intervention scores and immediately post-intervention values, for all outcomes analysed in the exercise versus control comparison

Outcome	Change from baseline						Immediately post-intervention values					
	Trials	*N*	MD	Lower 95% CI	Upper 95% CI	I^2 (%)	Trials	*N*	MD	Lower 95% CI	Upper 95% CI	I^2 (%)
SBP (mmHg)	4	158	-2.93	-7.06	1.20	50	4	158	2.02	-6.82	10.86	87
DBP (mmHg)	4	158	-2.19	-5.23	0.85	46	4	158	-0.82	-3.49	1.84	31
FBG (mg/dL)	9	263	-1.08	-2.47	0.30	16	8	238	-1.69	-4.35	0.97	37
FI (µIU/mL)	9	263	-2.44**	-4.24	-0.64	91	8	238	-2.11**	-3.49	-0.73	40
HOMA-IR	8	173	-0.57**	-0.99	-0.14	87	7	148	-0.22	-0.80	0.36	69
Total Cholesterol (mg/dL)	7	225	-5.88**	-9.92	-1.83	35	7	225	-6.35**	-10.76	-1.95	0
LDL-C (mg/dL)	7	225	-7.39***	-9.83	-4.95	0	7	225	-6.68**	-11.66	-1.70	0
HDL-C (mg/dL) ▲	7	225	0.29	-1.46	2.04	52	7	225	1.87	-1.59	5.33	65
Triglycerides (mg/dL)	7	225	-4.78***	-7.52	-2.05	3	7	225	-1.97	-7.36	3.42	18
VO_2 max (ml/kg/min)	6	229	3.84***	2.87	4.81	17	5	184	5.01***	3.48	6.54	42
Resting Heart Rate (bpm)	4	156	-2.65	-5.55	0.25	51	4	156	-3.26***	-4.93	-1.59	0
BMI (kg/m^2)	11	331	-0.49	-1.04	0.06	66	10	272	-1.02**	-1.81	-0.23	0
Body Mass (kg)	7	139	-1.25	-3.27	0.76	33	6	128	-0.48	-4.86	3.91	0
WC (cm)	7	221	-2.62***	-4.13	-1.11	53	7	221	-2.33	-5.23	0.58	15
WHR	2	101	-0.03	-0.08	0.02	0	2	101	-0.04	-0.08	0.01	19
Body Fat (%)	3	60	-1.39*	-2.61	-0.18	30	3	60	-3.28	-7.39	0.83	22
Fat Mass (kg)	3	63	-1.70	-3.93	0.53	70	2	38	5.14	-14.39	24.68	65
FFM (kg)	3	63	0.46	-0.89	1.81	58	2	38	4.99	-7.31	17.28	75
Testosterone (nmol/L)	5	203	-0.09	-0.24	0.06	0	5	169	-0.08	-0.35	0.19	37
SHBG (nmol/L)	4	173	7.51	-8.01	23.04	89	4	139	4.03	-18.57	26.63	66
Free Testosterone (pg/mL)	2	74	-0.43	-1.74	0.88	76	2	41	0.33	-0.10	0.77	0
FAI	4	139	0.24	-0.55	1.04	0	4	139	0.68	-1.09	2.44	46
FG	2	135	-0.63	-2.08	0.81	0	2	101	-0.75	-2.03	0.54	0
Oestradiol (pmol/L)	4	190	-13.94	-54.53	26.64	65	2	120	0.27	-11.27	11.80	0
DHEA-S (µmol/L)	2	70	-0.60	-1.58	0.39	0	2	36	-0.20	-1.87	1.46	0
LH (IU/L)	4	185	-0.30	-2.54	1.95	72	4	151	-0.66	-2.39	1.06	43
FSH (IU/L)	4	185	0.23	-0.08	0.53	0	4	151	-0.01	-0.40	0.37	0
LH/FSH ratio	2	41	-0.02	-0.38	0.33	0	2	41	0.32	-0.22	0.86	37
Progesterone (nmol/L)	2	115	-0.72	-2.53	1.09	74	-	-	-	-	-	-
Prolactin (ng/mL)	2	110	-0.05	-0.71	0.61	0	2	110	0.20	-0.27	0.68	0
hsCRP (mg/L)	2	38	-0.41	-1.19	0.37	0	2	38	0.67	-1.31	2.65	0
AMH (ng/mL)	3	67	-0.67	-1.65	0.32	0	2	67	0.48	-1.89	2.84	0

Adiponectin (µg/mL)	2	70	-0.20	-1.04	0.64	0	-	-	-	-	-	-	

Key: 95% CI: 95% confidence intervals; SBP: systolic blood pressure; DBP: diastolic blood pressure; FBG: fasting blood glucose; FI: fasting insulin; HOMA-IR: homeostatic model of assessment - insulin resistance; LDL-C: low-density lipoprotein cholesterol; HDL-C: high-density lipoprotein cholesterol; BMI: body mass index; WC: waist circumference; WHR: waist to hip ratio; FFM: fat free mass; SHBG: sex hormone binding globulin; FAI: free androgen index; FG: Ferriman-Gallwey score; DHEA-S: dehydroepiandrosterone sulfate; LH: luteinising hormone; FSH: follicle stimulating hormone; hsCRP: high-sensitivity C-reactive protein; AMH: anti-Müllerian hormone. ▲: positive values favour exercise over control. Statistically significant effects denoted by: * $P \leq 0.05$; ** $P \leq 0.01$; *** $P \leq 0.001$. Trials: number of studies included within analysis, *N:* number or participants included within analysis. Effect estimates are reported as mean differences (MD), and 95% confidence intervals, between exercise and usual care groups. Heterogeneity reported using I^2 statistic.

Table 4. Summary of findings for Primary Outcomes: exercise versus control.

Exercise compared to usual care for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise

Comparison: usual care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with usual care	Risk with exercise				
Systolic blood pressure (change from baseline) follow up: range 8 weeks to 16 weeks	The mean systolic blood pressure (change from baseline) ranged from **-2.5 to 1.1** mmHg	The mean systolic blood pressure (change from baseline) in the intervention group was 2.93 mmHg lower (7.06 lower to 1.2 higher)	-	158 (4 RCTs)	⨁⨁◯◯ LOW [a,b]	Exercise may result in little to no difference in systolic blood pressure (change from baseline).
Diastolic blood pressure (change from baseline) follow up: range 8 weeks to 16 weeks	The mean diastolic blood pressure (change from baseline) ranged from **-3.1 to 2.9** mmHg	The mean diastolic blood pressure (change from baseline) in the intervention group was 2.19 mmHg lower (5.23 lower to 0.85 higher)	-	158 (4 RCTs)	⨁⨁◯◯ LOW [a,b]	Exercise may result in little to no difference in diastolic blood pressure (change from baseline).
Fasting blood glucose (change from baseline) follow up: range 8 weeks to 16 weeks	The mean fasting blood glucose (change from baseline) ranged from **-1.3 to 2.6** mg/dL	The mean fasting blood glucose (change from baseline) in the intervention group was 1.08 mg/dL lower (2.47 lower to 0.3 higher)	-	263 (9 RCTs)	⨁⨁◯◯ LOW [c,d]	Exercise may result in little to no difference in fasting blood glucose (change from baseline).

Table 4. Summary of findings for Primary Outcomes: exercise versus control.

Exercise compared to usual care for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise

Comparison: usual care

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with usual care	**Risk with exercise**				
Fasting insulin (change from baseline) follow up: range 8 weeks to 16 weeks	The mean fasting insulin (change from baseline) ranged from **-4.1 to 2.5** µU/ml	The mean fasting insulin (change from baseline) in the intervention group was 2.44 µU/ml lower (4.42 lower to 0.64 lower)	-	263 (9 RCTs)	⨁◯◯◯ VERY LOW [e,f,g]	Exercise may reduce fasting insulin (change from baseline) but we are very uncertain.
HOMA-IR (change from baseline) follow up: range 8 weeks to 16 weeks	The mean HOMA-IR (change from baseline) ranged from **-0.4 to 0.7**	The mean HOMA-IR (change from baseline) in the intervention group was 0.57 lower (0.99 lower to 0.14 lower)	-	173 (8 RCTs)	⨁◯◯◯ VERY LOW [d,e,h]	Exercise may reduce HOMA-IR (change from baseline) but we are very uncertain.
Total cholesterol (change from baseline) follow up: range 8 weeks to 16 weeks	The mean total cholesterol (change from baseline) ranged from **-8.85 to 6.85** mg/dL	The mean total cholesterol (change from baseline) in the intervention group was 6.48 mg/dL lower (10.5 lower to 2.45 lower)	-	225 (7 RCTs)	⨁⨁◯◯ LOW [g,i]	Exercise may reduce total cholesterol (change from baseline) slightly.

Table 4. Summary of findings for Primary Outcomes: exercise versus control.

Exercise compared to usual care for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise

Comparison: usual care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with usual care	Risk with exercise				
LDL-C (change from baseline) follow up: range 8 weeks to 16 weeks	The mean LDL-C (change from baseline) ranged from **-17.7 to 7.03** mg/dL	The mean LDL-C (change from baseline) in the intervention group was 7.51 mg/dL lower (10.01 lower to 5.02 lower)	-	225 (7 RCTs)	⨁⨁◯◯ LOW [g,i]	Exercise may reduce LDL-C (change from baseline) slightly.
HDL-C (change from baseline) follow up: range 8 weeks to 16 weeks	The mean HDL-C (change from baseline) ranged from **-17.7 to 3.5** mg/dL	The mean HDL-C (change from baseline) in the intervention group was 0.01 mg/dL lower (1.91 lower to 1.89 higher)	-	225 (7 RCTs)	⨁⨁◯◯ LOW [d,i]	Exercise may result in little to no difference in HDL-C (change from baseline).
Triglycerides (change from baseline) follow up: range 8 weeks to 16 weeks	The mean triglycerides (change from baseline) ranged from **-1.0 to 8.9** mg/dL	The mean triglycerides (change from baseline) in the intervention group was 4.78 mg/dL lower (7.52 lower to 2.05 lower)	-	225 (7 RCTs)	⨁⨁◯◯ LOW [g,i]	Exercise likely results in a small effect that may not be an important (or unimportant) reduction in triglycerides (change from baseline).

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **MD:** Mean difference

Table 4. Summary of findings for Primary Outcomes: exercise versus control.

Exercise compared to usual care for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise

Comparison: usual care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with usual care	Risk with exercise				

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. Three of the four trials had a high or unclear risk of selection bias, detection bias, and reporting bias; all were at high risk of performance bias; two were at high or unclear risk of attrition bias; and all were at a high or unclear risk of contamination. Therefore we downgraded by one level.

b. Small number of participants, wide confidence intervals for three of the four trials, and null/negligible effect and appreciable benefit included in the confidence interval for the mean difference. Therefore, we downgraded by one level.

c. Most trials were at an unclear or high risk of selection bias, detection bias, and reporting bias; and all trials were at a high or unclear risk of contamination and low adherence. Therefore, we downgraded by one level.

d. Small number of participants and null/negligible effect and appreciable benefit included in the confidence interval for the mean difference. Therefore, we downgraded by one level.

e. Most trials were at an unclear or high risk of selection bias, detection bias, attrition bias, and reporting bias; and most trials were at a high or unclear risk of contamination and low adherence. Therefore, we downgraded by one level.

f. Considerable heterogeneity was observed. Therefore, we downgraded by one level.

g. Small number of participants and wide confidence intervals in the included trials. Therefore, we downgraded by one level.

h. Considerable heterogeneity was observed and there was minimal or no overlap of confidence intervals. Therefore, we downgraded by one level.

i. Most trials were at an unclear or high risk of selection bias, detection bias, and reporting bias; and all trials were at a high or unclear risk of contamination. Therefore, we downgraded by one level.

Table 5. Summary of findings for Primary Outcomes: exercise and diet versus diet.

Exercise and diet compared to Diet for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise and diet

Comparison: Diet

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with Diet	**Risk with exercise and diet**				
Fasting blood glucose (change from baseline) follow up: range 16 weeks to 20 weeks	The mean fasting blood glucose (change from baseline) ranged from **-7.0 to -3.2** mg/dL	The mean fasting blood glucose (change from baseline) in the intervention group was 2.92 mg/dL higher (0.4 lower to 6.23 higher)	-	78 (2 RCTs)	⨁◯◯◯ VERY LOW [a,b]	We are uncertain about the effect of exercise and diet on fasting blood glucose (change from baseline).
Fasting insulin (change from baseline) follow up: range 12 weeks to 20 weeks	The mean fasting insulin (change from baseline) ranged from **-2.9 to -18.54** µU/ml	The mean fasting insulin (change from baseline) in the intervention group was 2.22 µU/ml higher (3.7 lower to 8.14 higher)	-	90 (3 RCTs)	⨁◯◯◯ VERY LOW [a,c,d]	We are uncertain about the effect of exercise and diet on fasting insulin (change from baseline).
HOMA-IR (change from baseline) follow up: range 16 weeks to 20 weeks	The mean HOMA-IR (change from baseline) ranged from **-0.74 to -0.56**	The mean HOMA-IR (change from baseline) in the intervention group was 0.01 lower (0.45 lower to 0.43 higher)	-	78 (2 RCTs)	⨁◯◯◯ VERY LOW [a,b]	We are uncertain about the effect of exercise and diet on HOMA-IR (change from baseline).

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **MD:** Mean difference

Table 5. Summary of findings for Primary Outcomes: exercise and diet versus diet.

Exercise and diet compared to Diet for women with PCOS

Patient or population: women with PCOS

Setting:

Intervention: exercise and diet

Comparison: Diet

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with Diet	**Risk with exercise and diet**				

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. All trials were at an unclear risk of selection bias, reporting bias, contamination, and adherence issues. All trials were at a high risk of detection bias and attrition bias. Therefore, we downgraded by one level.

b. Small number of participants, only two trials, and wide confidence intervals in the included trials. Therefore, we downgraded by two levels.

c. Substantial heterogeneity was observed. Therefore, we downgraded by one level.

d. Small number of participants and trials, wide confidence intervals, and null/negligible effect and appreciable benefit included in the confidence interval for the mean difference. Therefore, we downgraded by two levels.